

The business of rapid transition

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ADVANCED REVIEW



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The business of rapid transition

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Abstract

In a context of climate emergency and calls from the IPCC for “transformative systemic change,” we need to revisit the role of business in helping to accelerate responses to climate crisis. The scale and depth of the challenges facing business have intensified in ways which force us to refocus our research on questions of urgency and speed, as well as the growing need for new and alternative business models and a fundamental re-balancing of the economy. There is a large literature dealing with business responses to climate change from a range of perspectives and disciplines covering issues such as corporate strategy and public policy engagement. But I argue that the question of the nature and speed of change now required, and whether there are historical and contemporary precedents for accelerated transitions within and beyond business, must assume a more central place in our research. This must be alongside growing efforts to understand how business will adapt to climate chaos. This conclusion implies a closer engagement and cross-fertilization of ideas with scholars of sustainability transitions, for example. Here, there is growing interest in the question of how to accelerate transitions, but where greater attention is required to the role of business actors.

This article is categorized under:

The Carbon Economy and Climate Mitigation > Decarbonizing Energy
and/or Reducing Demand

Policy and Governance > Private Governance of Climate Change

KEYWORDS

business, climate change, governance, transition

1 | INTRODUCTION

As long as there have been attempts to develop policy on climate change at national, regional and international levels, businesses have been involved in shaping, delivering and resisting responses to the issue. As innovators, lobbyists and “street-level bureaucrats” that have to implement policy, business is central to efforts to tackle climate change (Begg, van der Woerd, & Levy, 2005; Bumpus, Tansey, Perez Henriquez, & Okereke, 2015; Newell & Paterson, 2010). Significant bodies of scholarship have focused on firm-level case studies of corporate strategies (Böhm, Brei, & Dabhi, 2015) as well as sectoral (Okereke & McDaniels, 2012), national (Marthus, 2017), and regional (Jones & Levy, 2007) analysis of

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how businesses have responded to the threat (alongside overarching frameworks for understanding business and climate change (Hoffman, 2007; Hoffman & Woody, 2008; Ihlen, 2009; Kolk & Pinkse, 2005, 2007; Krabbe et al., 2015; Lee, 2012; Levy, 2005; Pinske & Kolk, 2009; Weinhofer & Hoffman, 2010). Political scientists and scholars of International Relations have also sought to understand business attempts to undermine or support public climate policy (Meckling, 2011; Newell & Paterson, 1998; Okereke, Wittneben, & Bowen, 2012), while others have looked at the role corporations play in generating new forms of private climate governance (Lovell, 2014; Pattberg, 2012). These strands of work will remain important as the interplay of corporate strategy and public and private regulation continues to unfold in the post-Paris landscape.

But something has changed. The scale and depth of the challenges facing business have intensified in ways which force us to refocus our research on questions of urgency and speed, as well as the growing need for new and alternative business models and a fundamental re-balancing of the economy including processes of industrial conversion. This is a process the current coronavirus crisis has already set in train. At the same time, greater attention will need to be paid to how businesses adapt to the growing severity of global heating and climate related disasters that results from decades of intransigence and the dominance of business as usual politics and business. What has driven this change is an acknowledgement that we are now in a climate emergency, as the IPCC SR15 (2018) and many other scientific studies have highlighted (Steffen et al., 2018). Around the world, from the local to national levels, government authorities are declaring climate emergencies and seeking strategies for rapid transition to act accordingly. As of early 2020, over 1,400 local governments in 28 countries representing 798 million citizens have made climate emergency declarations. But a parallel response for business to act at the scale and speed needed to address climate change is also required.

The United Nations IPCC report on 1.5°C, released in October 2018, left little room for doubt about the need for rapid transitions in business and across society if catastrophic levels of climate change are to be avoided (IPCC, 2018). It also pulled few punches about the scale of change, calling for “transformative, systemic change.” While transitions are underway in various countries around energy efficiency and electrification, the carbon intensity of fuels and land-use change, for example, limiting warming to 1.5°C will require a far greater scale and pace of change. Such transitions have been observed in the past within specific sectors and technologies, “but the geographical and economic scales at which the required rates of change in the energy, land, urban, infrastructure and industrial systems would now need to take place, are larger and have no documented historic precedent” (IPCC, 2018, p. 317). The latest UNEP *Emissions Gap* report further confirmed that current pledges leave us on course for 3.4°C of warming with devastating consequences (UNEP, 2019). It means, for example, that current global carbon emissions need to peak by 2020, halve by 2030 and fall to zero or thereabouts by 2050. And because that is a global target, it means that wealthier countries with a larger historical responsibility, where many of the world’s largest firms are headquartered, will have to go that much further and faster.

So, where does this leave business? How far and in what ways are businesses responding to the need to align their corporate strategies with a 1.5°C trajectory? What do we know of the drivers, precedents and possibilities for more rapid change in the business sector? Business represents the great paradox of rapid transition. On the one hand, much is expected of business in terms of technological innovation, new models of financing and shifts in business models to adjust to this new reality. On the other hand, many corporate actors are moving slowly, or deliberately seeking to delay action on climate change because they profit so much from the status quo, as many of the examples below illustrate, and current bailouts for oil companies and airlines as a result of Covi-19 underscore. Yet business is clearly not a monolithic and homogenous sector, even if sometimes treated as such. Very different dynamics apply to businesses of different scale and ownership structure, from micro social enterprises to medium cooperatives and large shareholder owned corporations. They are also located in different political economies and subject to different governance regimes which all have a bearing on what is expected of them and how much room for maneuver they have to innovate and adapt (Mikler, 2009; Mikler & Harrison, 2012).

In this paper, as well as attempting to review relevant academic literature, given the recent and contemporary nature of some aspects of this debate, I also cite from grey literature and media imaginative examples of business-led rapid transition. I argue that while there is a large literature dealing with business responses to climate change from a range of perspectives and disciplines from business and management studies to sustainability scholars and political scientists, covering issues such as corporate strategy and public policy engagement, the question of the nature and speed of change now required, and whether there are historical and contemporary precedents for accelerated transitions within and beyond business must assume a more central place in our research. This needs to occur alongside growing efforts to understand how business will adapt to the increased social and environmental disruption caused by global heating. This implies a closer engagement and cross-fertilization of ideas with scholars of sustainability transitions, for

example, where there is growing interest in the question of how to accelerate transitions, but where greater attention is required to the role of business actors (Bromley, 2016; Roberts et al., 2018).

2 | CLIMATE FOR BUSINESS

There is now a large literature on business and climate change which has evolved over nearly 25 years, albeit with most contributions coming in the last 10–15 years. It covers a range of sectors, and regions (Pinske & Kolk, 2009; Pulver & Benney, 2013) and adopts qualitative and quantitative (Gasbarro, Iraldo, & Daddi, 2017) research methods: from surveys, databases (Bulkeley et al., 2014), interview-based research, discourse analysis (Ferguson, Sales de Aguiar, & Fearfull, 2016; Nyberg & Wright, 2012; Wright & Nyberg, 2016), social network analysis (Sapinski, 2016), geographical approaches (Walenta, 2018), ethnographies, and participant observation. I do not have space here to review all aspects of this literature systematically, but rather identify some key threads and highlight the ways in which they might help us to understand the question of rapid transition.

Firstly, there are voluminous case studies of business responses to climate change, which can help to generate insights on the combinations of internal and external drivers of change which will need to be aligned if businesses are to move faster in addressing climate change (Dunn, 2002; Porter & Reinhardt, 2007; Pulver, 2007; Sullivan, 2008; Sullivan & Gouldson, 2013). Studies have focussed on explaining differences between firms in the same sector based in different regions, drawing out internal and external drivers of corporate strategy (Dale, 2008; Damert & Baumgartner, 2018). For example, Sullivan and Gouldson (2017) find that external governance pressures can have a significant influence on internal governance of the firm and on corporate strategies and actions. However, specific actions are often constrained by the need to make a “business case,” whereby companies will generally only invest capital when there is a clear financial case for action. This raises the question of what happens when there is not an immediate business case, but rather a moral or ecological one which embodies a different understanding of the role of business in society, where wealth generation is a means to an end and not an end itself.

There has been an understandable tendency in much of the literature to focus on the role of larger firms because of the scale of the emissions associated with their operations and the corresponding power they wield as lobbyists and political actors. Yet it is worth recalling that 95% of private-sector companies in most industrialized economies are small and medium-sized businesses with fewer than 250 employees (Newell, Pattberg, & Schroeder, 2012). Collectively, they play a crucial, but understated and under-researched, role in sustainability transitions (Revell, Stokes, & Chen, 2010; Simpson, Taylor, & Barker, 2004). This is perhaps especially so around innovation (Burch et al., 2016; Westman et al., 2019) and social impact (Milesi & Aggio, 2008), even if individually they operate on small profit margins, are less well mobilized politically and sometimes more difficult to regulate than larger corporations.

The sectoral focus of scholarship has understandably been dominated by studies on fossil fuel majors and oil and car firms (Levy, 2005; Lovell, 2010; Mikler 2009; Pinkse & Kolk, 2012; Rowlands, 2000). But going forward there is a need to look at other sectors including those which have been neglected thus far, but which have a significant climate impact such as service-sector firms including IT and logistics companies. Many have made recent public commitments on climate change. For example, the software giant Microsoft aims to become “carbon negative” by 2030. To achieve this, it plans to impose an internal carbon price on emissions which will be extended to Scope 3 emissions (to users of their products), the proceeds from which will be re-invested in emission-reduction and carbon capture activities (Dolsak & Prakash, 2020). Significantly, Microsoft have also stated that they will accept responsibility for their historical emissions, pledging to remove them from the atmosphere by 2050. Meanwhile, Amazon's Climate Pledge, announced in late 2019, promises to use 80% renewable energy by 2024 and 100% by 2030, in part by installing solar rooftops on its centers and developing utility-scale wind energy projects to power its cloud computing infrastructure. While welcoming the scale of ambition, critics such as Greenpeace have noted that the e-commerce giant powers its warehouses with diesel and still funds climate-delaying policy and climate-denying think tanks, such as the Competitive Enterprise Institute, while both Google and Amazon provide artificial intelligence technologies to help oil and gas exploration (The Daily Telegraph, 2020).¹

Looking within and across firms to appreciate how they understand and engage with risks might be helpful in understanding the capacity and likelihood that firms can accelerate transitions. Seeking to capture these dynamics across scales, Rickards et al. (2014) explore three interconnected scales: micro (which includes individual and interpersonal factors and worldviews); meso (which covers network, organizational and institutional factors including management paradigms and organizational culture, for example); and macro (which refers to a broad range of environmental,

social, cultural, political, and economic factors). They conclude that senior decision-makers in government and business are “strongly focused on their ‘local’ professional context and near-term pressures, including reputation among peers, relationships with competitors, and real-time financial status. As a group they exist within a largely closed circuit and perceive the world from a particular narrow perspective” that “occludes more systemic or reflexive thinking or action. This deep propensity for inaction suggests that a coordinated multi-frontal approach is essential for a new more effective mitigation approach” (Rikards, Wiseman, & Kashima, 2014, p. 753), highlighting, as others have done, the importance of alliances and coalitions to support and accelerate decarbonization (Roberts et al., 2018) the like of which we have seen developing in recent years, as discussed below.

Beyond the creation of such “coalitions of the willing,” there is also scope to further develop forms of private governance and certification to reward businesses for adopting best practice. There is a large literature on private governance, some of which addresses standards, codes and forms of certification that pertain to climate change (Newell, 2011; Pattberg, 2012; Walenta, 2015). This includes reporting and disclosure schemes such as the Carbon Disclosure Project (CDP), the Global Gas Flaring Initiative, as well as sector specific initiatives of energy intensive users such as the Cement Sustainability Initiative. Given the importance of addressing deforestation and emissions from the agricultural sector, the role of multi-stakeholder roundtables on soy, beef and palm oil have also attracted attention (Buckley, Gibbs, McConnel, & Ehrmann, 2019; Elgert, 2012). Scholars such as Pattberg (2012) have explored how non-state actors can amplify pressures on corporations by translating climate change into a key business risk through the use, for example, of disclosure-based governance mechanisms in global climate politics.

Secondly, there are numerous studies of business lobbying at national, regional and international level (Falkner, 2008; Meckling, 2011; Newell & Paterson, 1998). These help us understand the organization and reinforcement of incumbent power and why there is such resistance to more ambitious climate action. Interesting recent work on “discontinuity” among transition scholars (Johnstone & Kivimaa, 2018; Rogge & Johnstone, 2017) usefully turns our attention toward how to “un-do” lock-in and check the power of incumbents. Social mobilization and “civil regulation” (of the private sector) also clearly has an important role to play in that regard in challenging business power and accelerating shifts away from fossil fuels, for example, through shareholder activism, divestment campaigns and protest (Bergman, 2018; Newell, 2008). They can also play an important role in lending their support to policy interventions which support niche and often smaller business actors. For example, the UK based NGO *Possible* played a key part in reversing the freeze on support for onshore wind farms in the UK announced in 2020 (Langford, 2020).

Despite evidence of shifts on the part of the business community, the role of business in slowing down responses to climate politics and resisting calls for accelerated action is far from over. Indeed, as the prospect of more meaningful and ambitious action increases, so the backlash intensifies. Contributions to political parties from fossil fuel companies have increased significantly in recent years as they feel the pressure. A new Australian Conservation Foundation report showed the fossil-fuel industry in Australia has doubled its donations to the major parties in the past 4 years giving \$1.9 m in 2018–2019 (Knaus, 2020). Meanwhile, in Brussels CEO et al. (2019) exposed how since 2010, five oil and gas corporations and their fossil fuel lobby groups alone have spent at least a quarter of a billion Euros on seeking to secure influence in European decision-making. A key litmus test of the appetite for change of major fossil fuel companies then, is whether they continue to engage in and support lobbying organizations working to counter more ambitious climate action. Lobbying by corporations from the fossil fuel industries has also led to them being granted significant bailouts as part of government support to sectors affected by Covid-19. Examples include Occidental’s successful lobbying for access to the US Federal Reserve “Main Street Lending Program” (Global Witness, 2020) or the \$28 m given to three coal mining companies with ties to officials in Donald Trump’s administration (Holden, 2020).

One way in which some scholars anticipate the dismantling of the power of the fossil fuel bloc in order to enable more rapid transitions, is through mobilizing the power of finance capital, an issue first studied in relation to the role of the insurance industry (MacLeod, 2010; MacLeod & Park, 2011; Mills, 2009; Paterson, 2001). Placed within broader historical perspective, the work of economic historians such as Carlota Perez (2002) is useful in appreciating the disruptive role of finance in accelerating the “creative destruction” of older industries and the creation of new ones. There have been active attempts to engage financial actors to mobilize this power whereby businesses collectively pledge the disclosure of information on GHG emissions for institutional investors (such as with the CDP) in an attempt to institutionalize the norm of corporate disclosure of carbon emissions. Some scholars have highlighted the potential and limitations of such finance-led initiatives (Harmes, 2011), while research from bodies such as UNEP (2015) points to the clear need for broader shifts in the financial system in order to provide an enabling environment for rapid transition. There is growing interest and concern too, however, in the financialisation of responses to climate change through the creation

of new asset classes such as catastrophe bonds, weather derivatives and crop insurance products for poorer farmers for example (Isakson, 2015), aimed less at raising ambition and more at capitalizing upon the climate crisis.

Thirdly, as well as responding to threats of regulation and the need to engage with efforts to mitigate climate change, businesses also increasingly have to adapt to the effects of climate change above and beyond measures put in place by governments to secure infrastructures, property, and assets. The review of research on adaptation in the business and management field by Linenluceke et al. (2013) suggests that most industry adaptation studies focus on how firms adjust to changing market conditions or changes in the political, economic or legal environment, but they largely exclude adjustments by companies to environmental change. Studies on firm and industry adaptation to climate impacts are beginning to emerge, but this is clearly an area that warrants more attention (Linnenluecke & Griffiths, 2010), especially since the longer action is delayed, the more businesses will have to rapidly adapt to the effects of climate change.

3 | CLIMATE OF OPPORTUNITY

Building on the discussion above about shifts within the business community and the desire to capitalize on emerging opportunities in the “new carbon economy” (Newell et al., 2012), other scholars have focussed on the new business opportunities opened up by responses to climate change around carbon trading and financialisation in particular. With the conclusion of the Kyoto Protocol in 1997 which helped to establish global carbon markets, climate change became a feature of companies’ CSR strategies (Begg et al., 2005; Bumpus et al., 2015). Realizing that attempts to discredit any action at all had failed, attempts switched toward using incumbent business power to shape and then benefit from the new market mechanisms (Stephan & Lane, 2015), most notably the Clean Development Mechanism (CDM), though many business actors also explored openings in voluntary carbon markets. In Europe, the struggle was around the rules and conduct of the European Emissions Trading scheme (ETS) which left loopholes for some sectors (such as aviation) while allowing windfall profits for major energy companies such as Germany’s RWE (Lohmann, 2006).

Some firms have also sought to set up their own trading and offset schemes including initiatives internal to companies, as well as sector-wide moves. In response to criticisms that the aviation industry has had a free ride, the industry set up its own CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) offsetting scheme in 2016 which was agreed by 192 countries through the UN’s aviation agency ICAO (International Civil Aviation Organization). Not only does the scheme rely heavily on controversial forestry sector offsets, it has also attracted critical attention from legal and technical scholars (Lyle, 2018; Scheelhaase, Maertens, Grimme, & Jung, 2018) assessing the scheme’s governance mechanisms and effectiveness. It is significant, nevertheless, because of the aviation sector’s large and rapidly increasing CO₂ emissions: if aviation were a country, it would be the sixth largest in the world, falling between Japan and Germany (Carbon Brief, 2019). A recent point of contention has been the baseline for the scheme which was to have been 2020, but in light of flights being grounded due to Covid-19, companies have been seeking to take it back to 2019 so as to avoid the costs of having to purchase significant amounts of additional offsets. The sharp decline in 2020 emissions and in baseline emissions, would mean an increase of over 60% in offsetting requirements over the lifetime of CORSIA.

With the conclusion of the Paris Agreement, carbon markets look set to return despite their poor performance to date, though disagreements persist about the rules which should govern their operation as was clear at the Madrid Conference of the Parties in December 2019 (Newell & Talyor, 2020). Advocates claim they are key to raising the level of ambition. Either way, business will have a key role and we can expect to see another wave of scholarship as new projects come on-line, markets are integrated and new flaws in the system are exposed by activist scholars.

4 | THE BUSINESS OF RAPID TRANSITION

So, can rapid transition ever be the business of business? This firstly invites the question, what do we mean by rapid? Within transition scholarship there is a lively debate about the speed of transitions and the scope for their acceleration (Smil, 2016; Sovacool, 2016), though the role of business is often assumed or under-analyzed. The length of time in which innovations take to go from initial commercial success to 2% market share can take over two decades because of “lock-in” (Unruh, 2000) or the “path dependency” of existing systems. When they do occur, fast transitions are considered anomalies, limited to countries with very small populations or highly specific contextual circumstances that strictly

condition any lessons that can be derived from them. In general, the only technologies that go faster are those that are more ready substitutes for existing technologies, a point we return to below.

In a context of climate emergency, transitions that take decades or centuries have to be radically accelerated given diminishing available carbon space. Sovacool is more optimistic about the prospects of achieving this than critics such as Smil (2016). He notes (2016, p. 203): “many transitions—at varying scales and sectors—that have occurred quite quickly—that is, between a few years and a decade or so, or within a single generation. At smaller scales, the adoption of cook stoves, air conditioners, and flex-fuel vehicles are excellent examples. At the state or national scale, almost complete transitions to oil and electricity in Kuwait, natural gas in the Netherlands, and nuclear electricity in France took only a decade, roughly, to occur”. He provides 10 case studies of energy transitions that affected almost 1 billion people and unfolded over just 1–16 years. “Clearly, this evidence suggests that some energy transitions can occur much more quickly than commonly believed” (2016, p. 203) he concludes.

These disputes among academics about the historical and temporal dimensions of transitions are compounded by the politics of how we define and measure rapidity and how we typologise transitions. The example of Brazil’s transition to flex-fuel vehicles (FFVs) is illustrative, which “arguably, took a year (from the start of the national program to large-scale diffusion), more than twenty years (from the first invention of a FFV in 1980), almost thirty years (from the start of their national ethanol program), or more than eight decades (from the first invention of a Brazilian engine capable of using ethanol in the 1920s)” (Sovacool, 2016, p. 211). Likewise, depending on which benchmarks you use, you can date the introduction of wind turbines to the 1880s and solar PV to 1954 (Fouquet, 2016).

In dealing with the temporal dynamics of transitions, there is always a danger of comparing “apples and oranges”, of drawing parallels, for example, between the slow dynamics of “grand transitions”: global primary energy transitions (from one fuel to another) to more rapid national and corporate-led transitions (Grubler, Wilson, & Nemet, 2016). In the case of the latter, even skeptics such as Smil (2016), concede that rapid transitions over just a few years are possible. The common characteristics of rapid transitions, according to Grubler et al. (2016), include where a new and well established technology simply substitutes for an old one (such as with clean cookstoves, or FlexFuel cars, for example), where substitute technologies have been previously used in other markets, benefitting from the experience of early adopters, where the scales, either national or sub-national, are relatively small, and finally where the technologies offer high and clear benefits for adopters such as health (cookstoves), flexibility (Flexfuels) cost and convenience, as well as benefitting from well-designed public policies. Other recent scholarship uses the language of amplification to develop a typology of eight processes which aim to increase the impact of initiatives for transformation: stabilizing, speeding up, growing, replicating, transferring, spreading, scaling up, and scaling deep (Lam et al., 2020). Although applied to urban transformations, it potentially provides a useful entry point for thinking about the role of business.

We do know that businesses adapt to competition and changing market conditions very quickly, as we are seeing in the context of the coronavirus pandemic. This exposes the fragility of some business models to shocks, while others are more resilient and adapt rapidly to re-purpose their corporate strategies in new circumstances. But it also clarifies the tough choices governments have to make about sectors they will support and those they cannot. Responses to the crisis afford an opportunity, one not taken in response to the 2007 financial crisis, nor thus far in response to Covid-19, to boost those businesses at the cutting edge of innovation for a zero or low carbon economy, while overseeing an accelerated, but managed, decline for fossil fuel industries. This raises a whole series of issues about what a just transition might look like that scholars have engaged with in recent years (Newell & Mulvaney, 2013; Swilling & Annecke, 2012) which draw attention to the uneven distribution of the costs of transitions and by whom these should be borne.

Amid this uncertainty, some corporations are, nevertheless, seeking to raise their level of ambition. There have been over 1,700 commitments to “bold action” from over 1,100 companies via the global coalition *We Mean Business*. Likewise, The *Corporate Leaders Group on Climate Change* has urged governments to deliver ambitious net zero strategy and some companies have embarked on initiatives to align their corporate strategies with the goals of the Paris agreement on climate change. Over 800 businesses are committed to meeting a 2° target according to the non-profit *Science Based Targets* (SBTs). This includes major corporations such as British Telecom, Unilever, Carlsberg and the supermarket chain Tesco. British Telecom, for example, has a Climate Stabilization Intensity (CSI) target that links a company’s financial and environmental performance to the necessary carbon reductions and is seeking to decarbonise their fleet by only using electric cars and using renewable energy to supply electricity to car depots. Climate risk assessments (CRAs) and science-based targets have been proposed as quantitative tools to mobilize action against climate change with SBTs used to align corporate carbon reduction goals to climate science and CRAs designed to help companies and investors manage and mitigate climate change risks (Walenta, 2018).

Returning to the theme of partnership and coalitions, it is significant to note that the broader uptake of SBTs occurred through a collaboration between the World Resources Institute, the World Business Council on Sustainable Development, and the CDP culminating in the *Mind the Science, Mind the Gap* initiative in 2014 which has since grown to form the SBTi initiative (SBTi, 2014). This independently validates targets set by companies, certifying their conformity with prescribed methodologies. Further expanding the reach of SBTs among business, in 2016 the CDP added SBT disclosures to its climate disclosure questionnaire and scoring system. To date, according to SBTi, 850 companies are taking science-based climate action and 350 companies have approved science-based targets.² Such businesses include major brands such as McDonalds, Wal-Mart and Unilever. Scholars have criticized SBTs on the basis that participating firms might manipulate future financial projections to minimize targets (Krabbe et al., 2015; Trexler & Schendler, 2015). In particular, they argue that the GEVA (Greenhouse gas emissions per unit of value added) tool will not keep emissions within the budget and only a small number of firms are actually in a position to take on such ambitious targets. It is clear then that we need improved methods to check corporate target setting against specific carbon budgets. Krabbe et al. (2015), for example, propose a method that generates carbon intensity pathways for companies based on sectoral pathways, what they call the “Sectoral Decarbonization Approach.”

There is a danger in emphasizing voluntary target setting, disclosure and reporting that corporate boards can shift responsibility for climate-related innovation to the accounting department, rather than taking a lead on it themselves. But there is some evidence of firm's overhauling their business models. Ørsted, the former Danish oil company, plans to have reduced carbon by 97% as soon as 2023 and has shifted entirely to renewable energy. Unilever, meanwhile, is committed to zero-carbon by 2030. Sectorally, there are new initiatives from the fashion industry by the UN aimed at significant reductions in greenhouse gas emissions (UNFCCC, 2019). Likewise, the “Getting to Zero Coalition” for shipping will seek to coordinate the launch of clean fuels and vessels as part of the UN International Maritime Organization's (IMO) pledge to halve emissions from 2008 levels by 2050.

As noted above, the role of finance could be critical to the prospects of acceleration. Early in 2020, Goldman Sachs downgraded the oil giant ExxonMobil from a “neutral” to a “sell” position. In January 2020, the world's biggest asset manager, BlackRock, said it would lower its exposure to fossil fuels after it signed up to the Climate Action 100+ initiative. This is an investor initiative aimed at the world's largest greenhouse gas emitters. Signatories commit to working with the 100 systemically important emitters that account for two-thirds of annual global industrial emissions, alongside more than 60 other companies in a position to accelerate the clean energy transition. The Transition Pathway Initiative (TPI)³ is a key partner of CA100+, providing data to help members assess whether high-emitting companies are aligning their corporate strategies with a path compatible with the Paris Agreement. For example, engagement with Royal Dutch Shell in 2018 resulted in the firm's commitment to set long-term emissions reduction targets, including Scope 3 emissions (indirect emissions in the value chain).⁴ There is scope for significant further research on the extent to which these developments can amplify the effects of earlier shareholder activism on climate change (Newell, 2008) as well as the growing divestment movement (Bergman, 2018).

5 | FUTURE CHALLENGES AND DIRECTIONS

There are a number of major challenges, however, that highlight the need for more profound change in business models. Many firms can decarbonize without fundamentally changing their core products, technologies and systems: what some scholars have referred to as “shallow decarbonization.” “Deep” decarbonization, on the other hand, requires companies to discontinue the production of energy-intensive products, adopt alternative technologies, and change internal processes, for example. This sort of decarbonization “displaces an existing market, industry, or technology and produces something new and more efficient and worthwhile. It is at once destructive and creative” (Dolsak & Prakash, 2019).

Around electricity generation, for example, the business model of the traditional utility is increasingly problematic from an environmental, as well as a business point of view, with declining profitability for incumbent companies (Eyre, Grünewald, McKenna, & Ford, 2018). This is driving the search for new opportunities in a decarbonized system within electricity markets, around the potential to address grid congestion with increased use of virtual platforms and “peer-to-peer” trading, and on the demand side, for example, in end-use efficiency. Although new market entrants have largely taken the lead, such as Tesla, Sunverge and Green Charge Networks, many leading European energy companies, notably E.On, Innogy and DONG, are changing their fundamental business models toward a stronger focus on renewable generation and grid development. This hints at the possibility that fossil fuel companies might transition and re-

purpose themselves to become energy companies over time. The focus will be on the service, rather than the technology or fuel which provided the focus of traditional business models.

But if ambitious climate targets are to be met, we need to go beyond “plug-and play” solutions where the technology changes but levels of consumption stay the same. Accelerated shifts toward sustainable production and consumption need to be combined (Bengtsson, Alfredsson, Cohen, Lorek, & Schroeder, 2018). From renewable energies to the electrification of transport systems, important progress is being made. But we also need to reduce demand and meet energy, food and transport needs in ways which bring down overall levels of consumption (Akenji, Bengtsson, Bleischwitz, Tukker, & Schandl, 2016). Without this, we create new resource extraction booms, around lithium and cobalt in the case of batteries for electric vehicles, for example, which bring other damaging social and environmental impacts in the name of rapid decarbonization as new strands of scholarship are revealing (Sovacool, Hook, Martiskainen, & Baker, 2019). This is to say nothing of so-called “rebound effects” whereby the benefits of more fuel-efficient engines have made people even more dependent on their cars or enable them to drive more often (Brockway et al., 2017; Stapleton, Sorrell, & Schwanen, 2017). We need transformative thinking, and lower aggregate consumption, rather than simply more efficient or alternative technologies. This represents an even greater challenge for business as usual.

There is also no way around the central problem that if the Paris Agreement is to be taken seriously, there are some industries whose very existence, short of a major re-purposing, is incompatible with a 1.5°C trajectory. For example, the great majority of known fossil fuel reserves cannot be burned if the world is to stay within a carbon budget that avoids catastrophic heating (SEI et al., 2019), meaning that no company relying substantially on fossil fuel extraction has a long-term future. Companies like Air France and Air New Zealand have signed up to voluntary climate change compacts but, barring technical changes which are not yet clear, these industries will not exist within two generations. And for all the talk of change, there is still plenty of greenwash. The CEO of the Climate Leadership Council recently penned an op-ed insisting that oil and gas companies understand the scale of the challenge and “want to be part of the solution.” We are essential “partners” in the energy transition, the narrative goes. All the while, data from the International Energy Agency’s (IEA) new report on *The Oil and Gas Industry in Energy Transitions* shows that oil and gas companies continue investing *against* a clean energy transition, directing 99.2% of their capital expenditure toward fossil fuels in 2019 (OCI, 2020).

And yet many businesses live quite easily with these contradictions. In a leaked internal report, the world’s largest financier of fossil fuels has warned clients that the climate crisis threatens the survival of humanity and that the planet is on an unsustainable trajectory. The report by JP Morgan economists David Mackie and Jessica Murray states: “We cannot rule out catastrophic outcomes where human life as we know it is threatened”. Moreover, “Although precise predictions are not possible, it is clear that the Earth is on an unsustainable trajectory. Something will have to change at some point if the human race is going to survive.” The fact their own activities are so heavily implicated in accelerating climate change went without mention. Since the Paris agreement of 2015, JP Morgan has provided \$75 bn (£61 bn) to companies in sectors such as fracking and Arctic oil and gas exploration (Greenfield & Watts, 2020).

This points to a more structural condition that needs to be addressed. The expectations of returns on investment built into conventional shareholder ownership structures tend to trump most other considerations in business, severely limiting the possibilities of rapid transition. The current system of corporate ownership separates the legal ownership of companies from those with moral management responsibility. The shareholder model, geared primarily toward satisfying financial interests, is the main reason why the purpose of business has focused obsessively on a single bottom line. This implies the need for models with broader ownership and accountability, as well as changes in company law and corporate governance around the responsibilities and liabilities of directors and stronger mandatory requirements around reporting and disclosure and stress testing companies for their compatibility with reaching ambitious climate goals (Cogan, 2006). There are now a range of alternative models of ownership from social enterprises to mutuals, community owned enterprises, charities, B-Corps, and cooperatives that might warrant further attention from researchers and businesses to better understand the strategies by which environmentally motivated enterprises might scale up their positive impacts (Vickers & Lyon, 2014).

Businesses also exist within and respond to society, and social pressure may ultimately be the thing which drives more rapid transitions, expressed directly as consumers, or indirectly as voters and active citizens. Popular engagement in climate activism from school strikes, to business sectors, the arts, local authorities and protest movements such as Extinction Rebellion has accelerated public engagement with issues of transition in the last few years, far more rapidly than many imagined possible. Consumer pressure alone can certainly be effective in rapidly shifting corporate strategy, as we know from the consumer boycotts of CFCs in the face of evidence about the thinning of the ozone layer in the late 1980s. Shifting patterns of demand around diet (such as reduced meat consumption in some parts of the world) or

the rising demand for electric vehicles create openings for businesses to provide lower carbon alternatives. Some business leaders have even suggested we are witnessing an embrace of degrowth by consumers. The CEO of the fashion retailer H&M recently warned about what he refers to as a new movement of “consumer shaming” pushing firms toward the creation of products that have longer lifespans or are locally produced. Interestingly, such transformations are not without precedent. For example, the American car industry was forced to move away from planned obsolescence when Japanese competitors entered the market in the 1970s-80s with more reliable and fuel-efficient vehicles that were built to last (Roulet & Bothello, 2020). Going forward, we can expect concerned consumers to increasingly drive changing consumption patterns that businesses will have to adapt to if they are to survive.

Clearly combinations of these factors shape the possibility of rapid transitions. Key elements include (a) clear and unambiguous government policy, (b) investors who are looking for opportunities in carbon reduction, (c) pressure from consumers to make the shift combined with broader social pressure, (d) leadership on the part of businesses themselves. These elements all need to be present at sufficient strength and at the same time as part of an ecosystem of change. A report from *The Carbon Trust* found that 70% of global business leaders are confident that action taken by consumers, governments, and investors will force the change to an environmentally sustainable future. Moreover, “76 percent see bottom line risks from direct impacts of climate change, and 84 percent see business opportunity in an environmentally sustainable future. Half believe they would have to fundamentally change products, services, or business models if drivers for environmental sustainability become strong” (Carbon Trust, 2015, p. 2). Most businesses then seem to be aware of what is expected of them and, to some extent, of the scale of the challenge they face. Fewer perhaps yet recognize the full implications of the speed of transition now urgently required in terms of profound disruptions to business as usual.

6 | CONCLUSIONS

For businesses, there is a clear need to understand what aligning a company to the 1.5°C climate target would look like if their corporate strategies are to enhance, rather than undermine, our collective well-being. This means not shying away from the fact that some businesses or business models may no longer be viable in a zero-carbon society. Business models themselves need to rapidly transition. Businesses are accustomed to technological and cultural disruption. They have to adapt all the time to threats from competitors and shifts in the landscape of supply and demand and consumer desire. Climate change adds to these pressures, while redefining many of them. More than incremental reforms, this implies a more fundamental shift in the way value is created, profits generated and shared and companies governed to ensure their strategies for securing profits are compatible with societal goals and the pressing need to contain further global heating.

While climate emergencies are being declared from local to national level, most businesses have yet to come to terms with what it means to align with the agreed 1.5°C target. At the moment, decisions by corporate majors continue to be made as if we are not in a situation of climate emergency. The 1.5°C target needs to be actively incorporated into all business planning from product and service design to expansion and growth plans, innovation and governance, including CEO and board level responsibility for the climate footprint of the company. Responding effectively to this challenge means a willingness to experiment and innovate and learn by doing, and to adopt new investment strategies. It means business becoming active advocates for new regulation and initiating enhanced forms of cooperation within and across sectors to identify best practice for rapid transition following in the wake of “business declares”. Business declares (a) “commit to tell the truth on the climate and ecological emergency, and to inspire urgent action and debate,” (b) “celebrate and support all the companies who declare and want to inspire others on this path,” (c) use their influence to “engage business leaders who want to understand what it means to declare” and challenges them to set their own targets and actions, (d) positions themselves as “challengers and urge faster action than the Paris agreement.” They state, “We are a coalition of the willing looking to make change happen. We are not claiming to be perfect and we are all on a journey. We commit ourselves to hold each other to account.”⁵

For researchers meanwhile, there are fruitful conversations to be had between transition scholars focussed on innovation and technology, scholars from business schools working on questions of corporate strategy and academics from other social sciences such as political science, sociology and psychology which draw attention to questions of policy, politics, and social power, including shifting landscapes of values and behavior, alongside historians who can enrich our understanding of precedents and previous examples of rapid transition. The transition literature has paid more attention to the question of speed and urgency in general, within which business has a key, yet insufficiently analyzed

role (Hörisch, 2015; Proka, Beers, & Loorbach, 2018). There is also a need to redress the Northern bias in business and transitions scholarship given the key role of private and state-owned enterprises in power houses like India, China, Brazil, and South Africa (Pulver & Benney, 2013). Again, scholarship on transitions in those settings provides a useful point of departure for understanding the role of business (Baker, Newell, & Phillips, 2014; Schmitz, 2017). Finally, there is a scope for further modeling and theorisation of the reciprocal links between how climate change impacts on business (politically and as a geophysical phenomenon) and how businesses drive climate change and influence responses to it, all within shifting landscapes of politics, geopolitics, and currents of social mobilization that will shape their future license to operate.

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CONFLICT OF INTEREST

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ENDNOTES

¹ The carbon footprint of the crypto-currency Bitcoin has also been analyzed by scholars (Stoll, Klaaßen, & Gallersdörfer, 2019)

² <https://sciencebasedtargets.org/companies-taking-action/>

³ The Transition Pathway Initiative (TPI) is a global, asset-owner led initiative which assesses companies' preparedness for the transition to a low carbon economy. The TPI is supported by over 60 investors with over \$18 trillion combined assets under management.

⁴ <https://www.transitionpathwayinitiative.org/tpi/publications/33?type=NewsArticle>

⁵ <https://businessdeclares.com/>

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